

ISG

Thermal Systems USA, Inc.

K-90 Talisman XL

with DIGITEK II
Digital Image Enhancement



OPERATING MANUAL



WARNING

Read and understand all instructions prior to using this product. Any tampering and/or disassembly of the thermal imager will void all warranties and could cause equipment damage. Maintenance and/or repairs beyond those described herein shall only be performed by an authorized ISG Service Center. Failure to observe this information could result in death or serious injury.



WARNING

Thermal imaging is not a technology designed to replace current firefighting tactics. Thermal imaging is a tool that allows a firefighter to be more effective and make better decisions. Failure to observe this information could result in death or serious injury.

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COMPANY BACKGROUND

Your imager was designed and manufactured by ISG Thermal Systems USA, Inc., the world's leading firefighting thermal imaging supplier. ISG system design engineers are specialists in the complex firefighting IR application and custom design the driving electronics and sensor support systems specific to the firefighting application.

With over 100 combined years of engineering experience designing and manufacturing firefighting thermal imagers, and thousands of imagers installed in the most progressive departments worldwide, you are assured of only the highest quality and reliability.

AUTHORIZED SERVICE CENTER

North America

ISG Thermal Systems USA, Inc.

305 Petty Road

Lawrenceville, GA 30043

USA

Tel: (678) 442-1234

Fax: (678) 442-1295

Web: www.isgfire.com

Email: info@isgfire.com





WARNING

Users of thermal imagers, regardless of brand or type, should always read the operation manual prior to using.

The ISG K-90 TalismanXL Thermal Imaging System is not life support equipment and should not be used as such. Thermal imaging is not a technology designed to replace current firefighting tactics. Rather, it is a tool that allow the firefighter to be more effective and make better decisions. Never use the K-90 TalismanXL Thermal Imaging System as the sole source of navigation.

1. All users must be thoroughly familiar with the K-90 TalismanXL's proper operation and limitations prior to use. This includes general understanding of thermal images and how they are interpreted. Improper use of the equipment in a hazardous atmosphere could result in death or serious injury.
2. The K-90 TalismanXL Thermal Imaging System must only be used by personnel familiar with the usage and limitations of the System. That includes usage in simulated fire conditions such as controlled live burn situations. Usage of the K-90 TalismanXL Thermal Imaging System by unauthorized, unfamiliar or untrained users may result in death or serious injury.
3. The K-90 TalismanXL Thermal Imaging System is complex electro-optical equipment and just like any other machinery, electronic systems are subject to potential failures. If a failure occurs, the user will no longer have access to the special thermal images provided by the K-90 TalismanXL System. Tactical usage of this equipment must not deviate from standard operating procedures used by personnel who do not have the benefit of the equipment.
4. Failure to follow standard operating procedures in a hazardous atmosphere could result in death, serious injury or disorientation should an equipment failure occur.
5. The K-90 TalismanXL Thermal Imaging System must be serviced only by authorized personnel. The K-90 TalismanXL includes high voltage components. Removing the cover causes a potential shock hazard. Never remove the cover.
6. The K-90 TalismanXL Thermal Imager will not provide images through glass, water, or shiny objects. These surfaces act like mirrors to the system.
7. The K-90 TalismanXL Thermal Imaging System will not provide thermal images underwater.
8. Users should be conscious of the battery life. Only enter a hazardous environment when a full battery charge is indicated on the battery charge indicator.
9. The K-90 Talisman Thermal Imaging Systems is not rated as "Intrinsically Safe." Do not use the system in environments or atmospheres where static or a spark



WARNING

10. Repeated exposure to high temperature environments without adequate periods for the unit to self cool, may result in degradation, loss of the thermal image or damage to the internal components. Be sure to allow adequate cool-down periods between high temperature exposures.
11. Exposure to high temperature environments for an extended period of time may result in degradation or loss of the thermal image. Be sure not to overexpose or heat saturate the equipment beyond the design tolerances of the system.
12. The service life of the K-90 TalismanXL depends in part on how it is used and the environmental conditions in which it is used. Under heavy usage, or under extreme environmental conditions, the service life of the equipment may vary.
13. Batteries supplied with the K-90 TalismanXL have been selected based on specific performance values. Replacement batteries must be obtained **ONLY** from an Authorized ISG Service Center.
14. The K-90 TalismanXL incorporates special automatic electric temperature control systems. Run time on each battery may decrease slightly when used in cold temperature environments.

It is important to often test the equipment to ensure that equipment is functional before entering a hostile environment. Always perform a visual check on the equipment to validate that it has not been damaged or degraded prior to use.

15. Never use the K-90 TalismanXL as the sole source of navigation. If system failure occurs, you may become disoriented or lost in a hostile environment which could result in death or serious injury.
16. Failure to exit a hostile environment immediately on observation of the low battery warning may result in system failure in a hostile environment which could result in death or serious injury.
17. The K-90 TalismanXL provides a thermal image in normal vision impairing conditions. The user could become distracted from safety precautions and protocols, leaving a partner or the communications range of the incident command structure which could result in death or serious injury.
18. While every effort has been made to ensure that your K-90 TalismanXL is both tough and reliable, the camera is a sophisticated electro-optical system that will fail if it is abused or exposed to environments beyond its design envelope.

Failure to observe these warnings could result in death or serious injury.

1. SPECIFICATIONS

Physical Characteristics

Weight (nominal):	4.1lbs
Dimensions:	4.5" x 11.4" (including visor)
Shell Material:	GRP
Color:	Yellow
Handstrap Material:	Kevlar

Infrared Characteristics

Detector:	Barium Strontium Titanate (BST) Solid State
Spectral Response:	8 μ m to 14 μ m
Thermoelectric Cooler	Sensor Solid State Thermoelectric Processor, Auxiliary Blower, Chassis heat dissipater
Dynamic Range:	Automatic, variable, Dynamic Range Control
Focus Range:	Automatic, 1.0m to infinity
IR Protection Window:	Yes
Sensitivity (nominal):	50mK
Field of View:	59 Degrees

Electrical Characteristics

Video Standard:	NTSC, (American TV Standard Compatible)
Controls:	Power On/Off Transmitter On/Off (if fitted) Video Overlay (if fitted)
Image Optimization:	Automatic, No operator adjustment required
Sleep Mode:	Not Required
Video Output:	1.0 V, Terminated into 75 Ohms, BNC
Start Up Time:	<60 Seconds (30 sec. typical)
Battery Technology:	Rechargeable NiMH
Recharge Cycles:	1000+

Display Characteristics

Technology:	Flat Screen (CRT)
Size (Diagonal):	3.5" (90mm)
Resolution (pixels):	510 x 492

Operational Characteristics

Operating Time:	NiMH - 4.85 Hours (nominal) AA Alkaline - 3.05 Hours (nominal)
Sub-zero Start Up:	Yes
Operating Temperature:	5 ⁰ F to ~840 ⁰ F (- 15 ⁰ C to ~450 ⁰ C)
Water Resistance:	IP 67, 3' 3" (1.0m) depth
Contaminant Resistant:	Yes

2. SYSTEM COMPONENTS

Your K-90 TalismanXL comes complete with the following:

Item	Description
------	-------------

- | | |
|---|--|
| 1 | K-90 TalismanXL Thermal Imaging Camera |
| 2 | Carrying Case |
| 3 | Battery Charger with Power Supply |
| 4 | NiMH Batteries (2) |
| 5 | AA Battery Pack |
| 6 | Pistol Grip Handle |
| 7 | Lanyard |
| 8 | CD with Operating Manual in PDF format |

In the event that any of the above items are not supplied, please contact ISG.



3. BATTERIES

3.1 Charging the NiMH Rechargeable Batteries

The rechargeable batteries supplied with the K-90 TalismanXL are shipped discharged. They must be charged prior to use. If immediate use is required, disposable AA batteries can be used in place of the supplied rechargeables.

For first time use, allow new batteries to remain in the charger for approximately 14-16 hours after the L.E.D. has turned green.

After the battery has been fully charged and removed from the charger, wait 15 seconds before charging another battery.

- Do not expose the charger to water.
- Do not place charger near any combustible materials while charging batteries.
- Charge batteries in a well ventilated area.



3.2 Inserting the Battery into the Camera

1. Invert the unit and place on a clean, non-abrasive surface. Release the battery cover by pushing the latch lock up and forward (toward the lens).
2. Unhook the battery latch and open the battery compartment.
3. Place the battery inside the battery compartment so that the metal side mates with the camera's contact points.
4. Slide the battery in place.
5. Close the battery compartment cover. Push the latch lock back (towards the back end of the camera), then push it downward (applying pressure) to seal the battery compartment.





CAUTION

NEVER allow battery terminals to short together. This will cause battery failure. Store in Pelican case with contact plate facing down. (Don't place batteries in pocket with keys/coins or loose in a bag, etc.)

Failure to observe these instructions may result in minor or moderate injury and / or equipment damage.

3.3 AA Alkaline Battery Clip

The K-90 TalismanXL also comes equipped with one AA style battery holder for using 10 standard alkaline AA batteries in place of the rechargeable ones.

1. Open the AA battery holder by pushing the cover off the clip **as shown**.
2. Insert the AA batteries into the clip. Make sure the polarity is correct.



3.4 Low Battery Indicator

The K-90 TalismanXL is equipped with an on-screen battery level indicator in the form of 10 vertical bars that appear next to the word "battery" on-screen. The bars disappear as you use up battery capacity. The words "Low Battery" appear on the screen when 8-15 minutes of time is remaining. Battery levels are transmitted to a remote monitor location using the Wireless Transmission Systems.

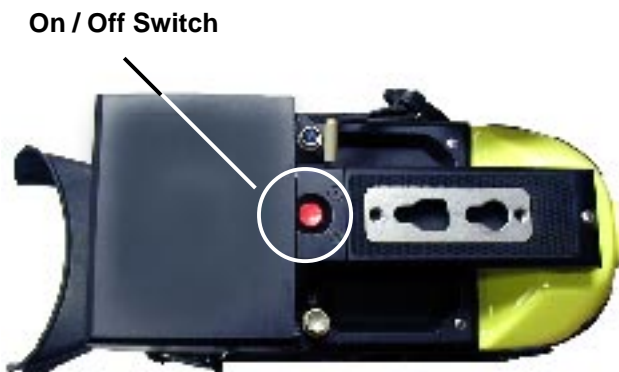


4. OPERATOR CONTROLS

The batteries left in an “in-service” thermal imager for extended periods of time must incorporate a standard checking procedure to ensure the batteries are fully charged when the unit is needed.

4.1 Switching the Unit On/Off

1. To turn the thermal imager on, press the red button on the bottom of the camera.
2. Notice that the green LED indicator light on the back of the thermal imager below the view finder will illuminate.
3. Wait approximately 15 to 30 seconds (up to 60 seconds in very cold weather) for the infrared sensor electronics to stabilize.
4. Once the thermal image appears on the screen, aim the thermal imager towards an object.
5. After approximately 1 minute of continuous use, a small white horizontal bar may be observed on the bottom left side of the viewfinder display. This is normal.
6. To turn the thermal imager off, press the red button on the bottom of the camera.



5. FITTING ACCESSORIES AND ADJUSTING FOR USE

5.1 Using the Handstraps

The ISG K-90 TalismanXL thermal imager is equipped with two easy to use and adjustable “camcorder style” handstraps on either side of the camera that fits firefighting gloves. The handstraps promote a secure grip on the camera. The handstraps are adjustable at the buckle.



1. To adjust, loosen the buckle on the handstrap to give it enough room to slide your hand between the handstrap and the camera. Take care not to over loosen the side straps to the extent that they offer no support.
2. Slide your hand through the strap so that your fingers grab the side of the case.

5.2 Attaching the Pistol Grip Handle

All K-90 TalismanXL thermal imagers are also equipped with a detachable quick connect pistol grip handle.

1. To install the pistol grip, match the two attachment ports on the camera with the male side of the attachments on the pistol grip. Slide the pistol grip into place. You should hear and feel the pistol grip lock in. **IMPORTANT: DO NOT** use the pistol grip unless you’ve determined you have positively locked it in place.
2. To unlatch the pistol grip, unlock the positive mechanism by sliding the lock tab and slide the pistol grip off the camera.



NOTE: The pistol grip slides in either way to give the user reversible options on how to orient the pistol grip.



5.3 Fast Attack Camera Cradle

When not in use, store the K-90 TalismanXL Imager (and charger) in its carrying case or the customer made Fast Attack Camera Cradle. The Fast Attack can be mounted vertically or horizontally for ready access.



6. THE K-90 TALISMANXL IN FIREFIGHTING ENVIRONMENTS

The K-90 TalismanXL camera is equipped with a BST thermal detector. The system's effective sensitivity is variable and is controlled by the main SAT controls microprocessor. The K-90 TalismanXL is equipped with multiple digital saturation control systems that allow you to clearly image very large fires, as well as objects in ambient room temperature automatically.

However, when panning in and out of a fire in a search and rescue application, be sure that you adequately look around the fire by panning in and out of the fire and letting the automatic SAT controls adjust so you see all the objects in the immediate area of the fire, or behind (or in front of) the fire.

The camera is IP67 waterproof rated and will withstand short term immersion in water of up to 3 feet.

7. CLEANING AND MAINTAINING YOUR K-90 TALISMANXL

Following use, the K-90 TalismanXL should always be cleaned and inspected for damage.

1. Inspect all lenses for soot and dirt build-up. Clean if necessary.
2. Normal "intended use" scratches on ISG's high efficiency aspheric lens do not degrade picture quality, however chips may affect lens transmission. Inspect IR lenses for chips.
3. Inspect the ISG K-90 TalismanXL for structural, heat, and/or chemical damage.
4. Inspect all battery contacts for damage.
5. Inspect battery charger.
6. Inspect all batteries and battery adapters for damage or leakage.
7. Check all switches including the battery charger for proper indication that systems are running correctly.
8. Inspect battery charger contact points for corrosion or damage.
9. Make sure battery charger is charging. See Page 6 for rechargeable battery instructions.
10. Inspect all lenses for heat or chemical damage, cracks and breaks.
11. Inspect the mechanical hardware to make sure no screws have loosened and no o-rings or gaskets have come loose or have been misplaced.



WARNING

For best results in using the K-90 TalismanXL Thermal Imaging System, perform the maintenance instructions as listed before and after each use. Failure to follow these instructions could result in death, serious injury and/or equipment damage.



WARNING

In the event that damage is detected (ie. cracked or broken window or housing), the imager should be IMMEDIATELY withdrawn from service and returned to an authorized service center for repair. Failure to observe this warning could result in death or serious injury.



CAUTION

The thermal imager should be cleaned using warm soapy water and non-abrasive cleaners. Allow the thermal imager to dry before replacing in its carrying case.

It is recommended that the IR Window and Display are treated with anti-fog solutions as used on SCBA/BA facemasks.

To ensure long service life, it is recommended that the thermal imager and its accessories are stored in temperate environment (65°F to 85°F, moderate humidity) at all times. Failure to observe these instructions may result in minor or moderate injury and/or equipment damage.

8. OPTIONAL ACCESSORIES

The following (optional) accessories are available.

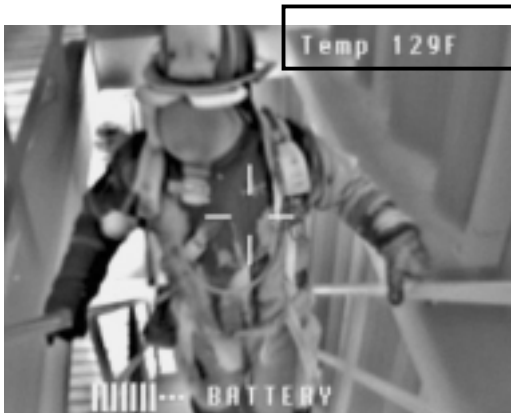
Item	Description
1	Digital Direct Temperature Measurement (DDT)
2	Digital Secured Wireless Transmission
3	Analog Un-Secured Wireless Transmission
4	Video Overlay
5	Fast Attack Camera Cradle

8.1 Digital Direct Temperature Measurement (DDT)

DDT is a non-contact temperature measurement feature that allows firefighters to determine the surface temperature of objects from a remote location.

If installed, DDT is operational at all times and cannot be switched **Off** or **On**. When DDT is installed, the internal viewfinder will be equipped with crosshairs in the center of the screen. To measure the temperature of an object, it must be placed inside the crosshairs. The observed surface temperature of the object is displayed on the upper right hand corner of the viewfinder. The temperature range is 1,832°F.

The accuracy of the relative temperature is affected by many factors, including the “emissivity” of the object. An object’s emissivity is its ability to either absorb or reflect heat energy. The better the characteristic to absorb heat (the higher the emissive value), generally the more accurate the temperature reading.





WARNING

When looking at shiny objects such as chrome, unpainted aluminum, unpainted stainless steel, and other metals, the DDT temperature readings can be significantly distorted. It should be noted that when viewing a fire scene, DDT is measuring the temperature of an object and NOT the air temperature. Failure to observe this warning could result in death or serious injury.

8.1.1 Emissivity and its Effects on DDT

The DDT provides the average relative (or “observed”) temperature of an object, or objects within the crosshairs. The relative temperature is displayed in numerical form in the upper right hand corner of the viewing screen.

The accuracy of the relative temperature is affected by many factors, including the “emissivity” of the object. In short, an object’s emissivity is its ability to either absorb or reflect heat energy. The better the characteristic to absorb heat (the higher the emissive value), generally the more accurate the temperature reading.

The DDT installed in the K-90 TalismanXL assumes an emissivity of 0.95. That is, for objects with emissivity of 0.95, the DDT will return temperature readings with maximum accuracy. The value of .95 was chosen because most objects found in normal, traditional structural firefighting environments will have an emissivity value close to 0.95. This will give the firefighter the most accurate average temperature possible, under these conditions.

However, when looking at shiny objects such as chrome, unpainted aluminum, unpainted stainless steel, and other metals, the DDT temperature readings can be significantly distorted. (For painted objects, the emissivity of the paint, rather than the emissivity of the actual material should be considered.) When the temperature of metal objects are being estimated using DDT, it is important to note that painted metal objects generally return a much more accurate temperature readout than unpainted metals.

The cross-tabulation in the tables following will give the user a general idea of the effective (real) temperature versus the observed temperature, given varying emissivity levels. The higher the material’s emissivity, the more accurate the DDT reading will be.

8.1.2 Typical Emissivity Values

MATERIAL (METAL)	EMISSION	MATERIAL (NON-METAL)	EMISSION
Aluminum		Asbestos	0.95
Un-oxidized	0.02 – 0.1	Asphalt	0.95
Oxidized	0.2 – 0.4	Brick	0.90 – 0.98
Roughened	0.1 – 0.3	Ceramic	0.95
Brass		Clay	0.95
Burnished	0.3	Concrete	0.95
Oxidized	0.5	Cloth	0.95
Copper		Glass (plate)	0.85
Polished	0.03	Gravel	0.95
Roughened	0.05 – 0.1	Ice	0.98
Oxidized	0.4 – 0.8	Limestone	0.98
Iron		Paint	0.90 – 0.99
Un-oxidized	0.05 – 0.2	Paper	0.95
Oxidized	0.5 – 0.95	Plastics (opaque)	0.95
Rusted	0.5 – 0.7	Rubber	0.95
Steel		Sand	0.90
Cold-rolled	0.7 – 0.9	Snow	0.90
Ground sheet	0.4 – 0.6	Soil	0.90 – 0.98
Polished	0.1	Skin (human)	0.95 – 0.98
Oxidized	0.7 – 0.9	Water	0.93
Stainless	0.1 – 0.8	Wood (natural)	0.90 – 0.95

ACTUAL VS. DISPLAYED TEMPERATURES FOR DIFFERING EMISSION

Temperature of Surrounding, deg C 20

Displayed Temperature, deg C

	0	20	40	60	80	100	150	200	250	300	350	400	450	500
0.1		20	138	209	267	317	428	529	624	717	809	899	989	1078
0.2		20	93	146	190	231	321	404	484	561	638	713	789	863
0.3	-72	20	74	116	154	188	268	341	413	482	551	619	687	755
0.4	-38	20	62	99	131	162	234	301	367	431	495	558	621	684
0.5	-23	20	55	87	116	144	209	272	334	394	454	514	573	632
0.6	-14	20	50	78	104	130	191	250	308	366	423	479	536	592
0.7	-8	20	46	71	96	119	176	233	288	343	397	452	506	560
0.8	-4	20	43	66	88	110	165	218	271	324	376	429	481	533
0.9	-1	20	41	62	83	103	154	206	256	307	358	409	460	510
1	1	20	39	58	78	97	146	195	244	293	342	392	441	490

8.2 Wireless Transmission

8.2.1 Connecting the Receiver to a Monitor

1. Plug the AC wall adapter or the 12 volt car cord into the receiver.
2. Connect one end of the 10 ft. antenna cable to the antenna, the other end to the receiver. The ends have different connector types and are not interchangeable.
3. Connect the supplied video cable to the receiver (BNC jack) and the video monitor (TV). Be sure the video cable's RCA connector is fitted to the "Video IN" jack of the monitor.
4. Plug the AC wall adapter into a suitable 120VAC wall outlet, or plug the 12 volt car cord into a 12 Volt DC accessory jack (cigarette lighter). The red LED should illuminate indicating power on.
5. The video monitor/TV should have the proper input selected. IT WILL NOT BE CHANNEL 3 or 4, etc. Typically it is "LINE", "LINE IN", "AUX", "L1", "R1", etc.
6. Power up thermal imager and activate the video transmitter. Select the proper channel on the receiver and video should be displayed.



NOTE: The video monitor typically used is a small TV or TV/VCR combination. The unit must have an RCA type "Video IN" connector. **It is not possible to adapt to and use the "Cable" or "Antenna" input connector.**

8.3 Video Overlay

The Video Overlay system is an optional feature that allows firefighters to obtain a standard video image of the scene, superimposed on the thermal image. When a K-90 TalismanXL camera is equipped with Video Overlay, there will be a button on the top of the camera. Press the button to activate the Video Overlay. The effect is a combination of a Thermal Image and a Video Image display of the scene. Press the button again to deactivate Video Overlay.

Video Overlay is retrofittable to K-90 TalismanXL cameras at any time by calling ISG, and returning the camera to the factory for upgrading.



Video Overlay **OFF**



Video Overlay **ON**

9. RETURN AUTHORIZATION (RA) PROCEDURE

In the event that your ISG Thermal Imager is in need of repair, the following outline will speed the process of your request.

An RA Number **MUST** be issued for all products returned to ISG.

To obtain a Return Authorization Number, contact your local Distributor or ISG Thermal Systems directly at (877) SEE-FIRE or (678) 442-1234

Once in the voice prompt, dial 4 for the RA department, to be issued an RA Number for your repair.

Please have all of the following information readily available when calling.

- Company Name
- Physical Shipping Address
- Primary Contact Person
- Contact Telephone Number
- Camera Serial Number (located inside battery compartment)
- Detailed description of problem

Note: Prior to returning the thermal imager, the device should be fully decontaminated. Non-decontaminated units will not be serviced by ISG.

When shipping the imager, place it inside its original carrying case. The carrying case should then be boxed and sealed appropriately .

Mark shipping container clearly with the RA Number for proper processing.
(le: Permanent Marker)

All RA's will be shipped directly to the Authorized Repair Center:

**ISG Thermal Systems USA, Inc.
305 Petty Road, Suite B
Lawrenceville, GA 30043**

RA # XXXX

Note: ISG will not be responsible for damages or losses incurred during shipping.

WARRANTY

ISG Thermal Systems USA, Inc. warrants the K-90 TalismanXL thermal imager to the original owner to be free of defects in material and workmanship under intended use and service for one year from the date of purchase. ISG's obligation under this warranty is limited to the replacement or repair, at ISG's option, of articles if returned to ISG in Georgia, or an authorized distributor, with shipping charges prepaid by the owner, and which, upon inspection by ISG, shall prove to have been defective in normal, "intended use" and service. Maintenance and field replaceable items (batteries, battery chargers, AC/DC adaptors, straps, display covers and all accessories), if defective, are covered under warranty for a ninety (90) day period.

This warranty does not apply to equipment malfunction or damage resulting from accident, alteration, misuse, or nonintended abuse of the equipment including, but not limited to, power surges, over exposure to heat, defective power supply, abnormal wear and tear or other perils outside the design tolerances of the system. In addition, this warranty does not apply to elastomer or rubber components since they can be adversely affected by undue exposure to heat, sun, water, ozone, or other deteriorative elements. The decision as to what constitutes normal use shall be made solely by ISG.

To maintain this warranty, the purchaser must perform maintenance and inspections as prescribed in the operation and maintenance manual which shall include prompt replacement or repair of defective parts.

This warranty is expressed in lieu of all other warranties, expressed or implied, and all other obligations and liabilities on ISG's part. ISG neither assumes nor authorizes any other firm or person to assume on ISG's behalf any liability in any way connected to the sale of ISG Products.

PLEASE RETURN THE BOTTOM PORTION OF THIS PAGE VIA MAIL, OR FAX TO:

WARRANTY SHEET FOR ISG K-90 TalismanXL

ISG Thermal Systems USA, Inc., 305 Petty Road, Lawrenceville, GA 30043

Fax Number (678) 442-1295

NAME OF DEPARTMENT: _____

PHYSICAL ADDRESS: _____

CITY / STATE / ZIP: _____

PHONE: (____) _____

ALTERNATE PHONE: (____) _____

FAX: (____) _____

SERIAL NUMBER: _____